

## **REMARKS**

### **I. Prosecution History and Current Status of Claims**

An RCE was filed 10/03/2003 wherein Applicant presented Claims 1-16 and 19-57, from which Claims 1-16 and 19-57 remain pending in the application for examination. Claims 58-59 are erroneously cited to a being part of the case; however, the claims of record only go up to Claim 57. Applicant will only address claims 1-16 and 19-57 herein.

In the current Office Action, Claims 1-16 and 19-57 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jewell et al (US6359920) in view of Ishikawa (US5841152). In response to the Office Action, Applicant has amended independent claims 1, 37 and 48 and now presents the following remarks. Applicant respectfully requests reconsideration of his application for patent in light of the following remarks.

### **II. Provisional rejection under "double patenting" doctrine.**

Claims 1-16 and 19-57 stand provisionally rejected under the judicially created doctrine of double patenting over claims 1-28 and 45-59 of co-pending Application No. 10/026,020, claim 1-6 of co-pending Application No. 10/026,055, and claims 1-27 and 29-34 of co-pending Application number 10/026,016. All three of the co-pending applications and the present application were filed on the very same date by Applicant. The Applicant intends to submit a terminal disclaimer under 37 CFR 1.321 once allowable subject matter is indicated by the Office.

### III. Rejections under 35 U.S.C. § 103

Claims 1-16 and 19-57 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jewell et al. (US6359920) in view of Ishikawa (US5841152). The Examiner indicates that Jewell does not disclose the quantum well depth being defined as the difference between a valence band offset and a conduction band offset. The Examiner cites to Ishikawa for teaching quantum well depth as being defined as the difference between a valence band offset and a conduction band offset; however Ishikawa does not teach that the quantum well depth is controlled using the difference between the valence and conduction bands to provide at least 40 MeV quantum well thickness

The Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jewell a quantum well depth defined as the difference between a valence band offset and a conduction band offset if Jewell were combined with Ishikawa for the benefit of calculating the quantum well depth. Neither Jewell et al or Ishikawa teach the establishment of optimal quantum well depths exceeding 40 meV by using the difference between valence band energy and conduction band energy. Although Jewell et al is focused on increasing energy within the active region of a semiconductor laser such as a VCSEL, Jewell, neither teaches nor suggests that a quantum wells "depth" which is a virtual area defined by the range between the valence and conduction bands can be controlled or adjusted. Jewell et al does not teach that control over settings for valence and conduction bands that can be used to establish optimum quantum well depths beginning at 40 meV. As illustrated in FIGS 1A and 5B of Ishikawa, thicknesses for the valence and conduction bands that happen to be greater than 40 meV. But Ishikawa does not teach that the values for each band (valence and conduction) are used to ensure that quantum well depth is at least 40 meV.

Applicant independent claims, 1 37, and 48, claim "an active region further comprising at least one quantum well having a depth of at least 40 meV, wherein said depth is defined using the difference between a valence band offset and a conduction band offset." Specific reference to achieving optimum valence and conduction band offsets for providing quantum wells having depths of at least 40 meV is new and not obviated by Jewell et al or Ishikawa. Applicant has

actually determined how to establish and control offsets, and quantum well depths as a result, by using certain materials. This is now clearly set forth in Claims 1, 37 and 48 wherein unique materials are used to produce valence and conduction bands that can values for each that help establish quantum well depths of at least 40 meV.

Discussions of how to achieve band offsets and establishing quantum well depths by Applicant is not interchangeable with general observations and discussions of band gap efficiencies or dimension. The distinction should be appreciated by those skilled in the art after reading Applicants description. When referring to Applicant's discussion of "band offset," one skilled in the art should realize that it is now possible to also achieve optimum confinement of carriers within quantum wells where the quantum well(s) begin at well depth of at least 40 meV based on the maintenance of a difference between valence and conduction bands beginning at at least 40meV.

Combining Ishikawa with Jewell et al would not achieve control over well depth adjustment exceeding 40 meV, which is an integral part of Applicants claims. For these reasons, the rejection of claims 1-16 and 19-57 is respectfully traversed.

**IV. Conclusion**

Applicant has responded to each and every objection and rejection of the Official Action and now believes that his application is in condition for allowance. Applicant respectfully requests that his application and claims be reconsidered and that a timely Notice of Allowance be issued. Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned representative to conduct an interview before further written action in an effort to expedite prosecution in connection with the present application.

Respectfully submitted,

Date: 12 July 2004

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